

d-Au Run History

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January 21, 2008

1 Fri 30 Nov

Ramp 9302 (59x59 bunches) started at 7:22 am.

0.876×10^{11} deuterons and 0.965×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 87.4%, Yellow ramp efficiency: 92.2%

During the day (as per Nick Kling):

The vast majority of of the shift was spent installing diagnostic equipment on the B10DQPSW quench switch and replacing the yo8-ql2 power supply. This work was prolonged for two hours by PLC controls problems while attempting to restore this system. Once the power supply work was complete a 59x59 bunch store (9307) with stochastic cooling on in Yellow was put up in RHIC. This store remains in the machine as of shifts end.

As per Greg Heppner:

“In reference to the 2:54 am QLI B10DQPSW, after this mornings meeting, we had a three hour window to work on this and we did not get done until 13:30, an hour over our allotted time. Work performed on B10DQPSW by Don Bruno, Wing Louie, Fred Orsatti, Jeff Wilke and Gregg Heppner:

1. Replaced the UPS.
2. Swapped the Main PLC and interconnect Signal Cable (9 pin D Connector) from B10DQPSW with B9DQPSW to see if fault in PLC moves to B9DQPSW.
3. Replaced Fuse Holder for F3 that feeds the 24 Volt power supply.
4. Installed Instrumentation to monitor F5 thru F12.

Then a two hour delay occurred after we were done when a MODICM failure developed. An open line in the T Drop above the B10DQSPW was the cause. Controls Group repaired this. Then we brought up the Links to Injection Current and handed it over to MCR at 16:00 to run two Hysteresis Ramps. After the two Ramps then checked all power supplies for any problems.”

Ramp 9307 (59x59 bunches) started at 5:36 pm.

1.07×10^{11} deuterons and 0.986×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.0%, Yellow ramp efficiency: 91.5%.

During the evening and overnight (as per Brian van Kuik):

Physics ran for 6 hours this shift with 2.4 hours of Machine Setup. There was 3.5 hours of downtime. One unknown beam loss causing the store inherited from the previous shift to be aborted early and the b4-dhx power supply tripping at the second store on this shift to end were the main sources of downtime. Initially W. Louie was called about a QPA crowbar fault associated with the b4-dhx power supply. He requested that D. Bruno be contacted and D. Bruno instructed CAS to replace the b4-dhx power supply’s 3 channel Isolation Amplifier board. Another store was put up, which continues as of the end of shift.

Ramp 9309 (59x59 bunches) started at 10:15 pm.

0.948×10^{11} deuterons and 0.921×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.4%, Yellow ramp efficiency: 95.8%.

Ramp 9311 (59x59 bunches) started at 1:25 am 1 Dec.

1.04×10^{11} deuterons and 0.965×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.1%, Yellow ramp efficiency: 92.6%.

2 Thur 29 Nov

During the early morning (as per Brian van Kuik):

Physics ran for 6.8 hours this shift with 1 hour of Machine Setup. There was 0.2 hours of downtime when the power supply yi7-tq5 tripped off causing the second store this shift to dump early. The first store this shift started on the previous shift. As of the end of shift, we are contacting Power Supply personnel to investigate the yi7-tq5 power supply. It doesn’t turn on from the TAPE sequence.

Prepare to dump (9293) issued at 4:48 am; dumped at 5:01 am.

Orbit corrections implemented (even though Tape recommended none).

Ramp 9294 (56x56 bunches) started at 5:44 am.

0.943×10^{11} deuterons and 0.942×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 96.3%, Yellow ramp efficiency: 95.0%.

Orbit corrections were clearly beneficial.

During the day (as per Nick Kling):

Physics ran for the final 1.5 hours on a single store that remains in the machine as of the end of the shift. **Work on Yellow Stochastic cooling is ongoing in the background of the store.** The remainder of the shift was spent completing various remaining setup tasks and measurements. There were two prolonged interruptions in the program during the shift. The first was due to a failure of the yi7-tq5 power supply in RHIC the replacement of this supply took about 2 hours to fully recover from. The other noteworthy failure occurred when a UPS for the LINAC went off. This caused an interlock from the EBIS chipmunk and a loss of the TTB crossover sweep.

Work planned for Todd's shift (8 am to 4 pm):

1. Measure Yellow tunes at injection versus various power supply settings as per list from Steve Tepikian. It is believed that one (or more?) of these supplies has the wrong polarity; it is hoped that the measurements will reveal which one(s). A 6x6 fill will be used at injection for the measurements.
2. Investigate BPM offsets in IR6 triplet. This can be done during the above 6x6 fill at injection.
3. Measure yellow tunes versus radius at store to determine linear and nonlinear chromaticity. Ramp 6x6 bunches to store **without cogging and rebucketing** for these measurements. Apply chromaticity corrections if appropriate.
4. Stochastic cooling setup in yellow. Do this with 59x59 bunches at store. If appropriate, use this store for Physics.
5. Undo changes made to AGS H10 magnet control yesterday. This effort can hide behind the above 59x59 store.

Todd's summary:

Accomplishments:

1. Started with some BPM work. Found yo8-bh10 reversed, and fixed this in software. Tested IR6 triplet BPMs for offsets relative to nearby quad centers; only bi5-bh1 was found to have a substantial offset, about $-940 \mu\text{m}$.
2. Many yellow power supplies were tested at injection, comparing model and BBQ tune changes for changes in each power supply. All changes matched model predictions, so the yellow power supplies listed in the 12:39 entry are all correct in polarity and effect.
3. Yellow injection coupling correction using RhicInjection worked well.
4. Yun predicted some nonlinear chromatic correction schemes, but none were tested.
5. A 6-bunch ramp for nonlinear chromaticity correction was successful, but we could not move the yellow radius. After 2h of diagnosis, we dumped just in time for RF personnel to determine that the RTDL encoder for the yellow radial steering frame was accidentally turned off, possibly due to a maintenance day power outage. Other RTDL channels were checked and corrected.
6. 10 Hz feedback was turned on for future stores.
7. A successful 59 bunch ramp was set up for physics and stochastic cooling setup.

Problems:

1. Changing yi10-qb9 by 1A in liveCurrent in psall moved the power supply an unpredictable amount; Larry Hoff has been contacted about this problem
2. Yellow radial steering RTDL was accidentally off from yesterday's maintenance, and was restored during this shift.

Ramp 9297 (59x59 bunches) started at 4:55 pm.

0.937×10^{11} deuterons and 0.906×10^9 gold ions in RHIC at injection.

Blue ramp efficiency: 90.4%, Yellow ramp efficiency: 93.3%

Stochastic cooling (in yellow) was brought on for part of this store.

For this ramp (as per Wolfram Fischer):

“From the last ramp, here are 3 Blue bunches with long-range beam-beam interactions (buckets 28, 148, and 268) and 3 bunches without long-range beam-beam interactions. The bunches with long-range beam-beam interactions have lower beam lifetime at injection. We need to increase the vertical separation at injection and/or change the tunes. The long-range beam-beam effect is also visible in the 3 selected Yellow bunches (buckets 28, 148, 268).”

Vadim then found that the yellow separation bump at IR6 was absent for this ramp (it had been removed during Todd’s work). The bump was restored and it was later found that the bunches with long-range beam-beam interactions (buckets 28, 148, and 268) were no longer affected.

During the evening and overnight (as per C. Naylor):

Physics ran for 7.55hrs this shift with two stores. The first store was cut short due to a permit link interlock and the second was dumped early because the store was poor and had large losses in the yellow ring. There were 2.77hrs of down time as a result of the permit link interlock and an ensuing quench link interlock in the blue ring. As of the end of the shift we are working to put up another 59 bunch store for physics.

Ramp 9298 (59x59 bunches) started at 00:27 am.

1.06×10^{11} deuterons and 0.999×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.9%, Yellow ramp efficiency: 92.6%

Ramp 9301 (59x59 bunches) started at 5:41 am.

1.12×10^{11} deuterons and 1.15×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 83.5%, Yellow ramp efficiency: 87.9%

3 Wed 28 Nov

During the early morning (as per Brian van Kuik):

Physics ran for 5.75 hour this shift with 0.9 hours of Machine Setup. A store (9287) inherited from the previous shift was dumped normally to refill RHIC. Afterwards a second store (9288) was put up which ended

early due to the yi7-tq5 power supply tripping off. A 90% Beam loss alarm prevented the refill of RHIC prior to the start of this morning's Scheduled Maintenance. As of the end of shift, Scheduled Maintenance is underway.

First successful back-to-back stores for Physics. Fill 9287 started last night and 9288 started early this morning.

During the day and evening:

Scheduled maintenance. Beam accelerating in Booster by 4 pm; in AGS by 5:30 pm; Fill 9293 with 56x56 bunches stored and cogged for experiments by 11 pm. Blue ramp efficiency: 95.0%, Yellow ramp efficiency: 91.1%.

Ramp 9293 (56x56 bunches) started at 10:46 pm.

0.857×10^{11} deuterons and 1.08×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 95.0%, Yellow ramp efficiency: 91.1%.

Maintenance summary from Paul Sampson (as of 6:37 pm):

The maintenance day started early in RHIC early this morning (just after 0600) and on time in the AGS. Work in the AGS was completed on time and the AGS was operational by 1730. There were several surprises associated with the power outage at 929 in that a that a timing fec for the RF did not come back up properly. RF personnel were able to reload proper timing values and restore systems. RHIC was swept and secured by 18:22, but a problem with blue b4q89 power supply delayed restoration of physics. Beam is presently on the W dump. AGS Vacuum chamber straight section at L5 was successfully replaced without incident. There are several air conditioning issues that will need to be resolved at a later date. At present, all of the alcoves have some air but alcoves 3a, 5b and 5c will need further attention.

4 Tue 27 Nov

During the early morning (as per Brian van Kuik):

Experimenter Setup ran for 1.25 hours this shift with 1.8 hours of Machine Setup.

There was also about 5 hours of downtime due to one store attempt (9279) failing when a beam loss monitor pulled the beam permit and another (9280) failing and requiring the replacement of the y2-q89 power supply.

W. Louie and D. Bruno were consulted prior to the y2-q89 power supply

replacement. As of the end of shift, a store (9282) continues for Experimenter Setup.

Ions per bunch at RHIC injection:

1. Fill 9279. 1.06×10^{11} deuterons; 1.09×10^9 gold ions.
2. Fill 9280. 0.980×10^{11} deuterons; 0.634×10^9 gold ions.
3. Fill 9282. 0.891×10^{11} deuterons; 0.664×10^9 gold ions.

During the day (as per Mei):

1. Wolfram and Peggy finished the longitudinal realignment work at injection.
2. Both Mikes also excersised the Stochastic kickers.
3. We then took the optics measurement at injection in Blue.
4. The second half of the shift was spent on getting the Yellow tune feedback ramp. We had couple of debunches at injection when the loop got closed. We managed to get the beam stay bunched and the ramp went pretty good until the beta squeeze part. The beam was aborted by the blm due to excessive losses.
5. Later on, we found this was because the yellow vertical tune started to walk towards 0.2 just before the beam abort. Greg implemented the feed forward of the first half of the ramp where we had good data. However, the second trial of tune feedback ramp failed right at snapback because the Yellow beam got debunched.
6. Yellow ps then suffered a QLI right after the main dipole got to the store. Peggy later on came and explained that the debunch could be due to the longitudinal work that she and Wolfram had done. Basically, the RF loop may not be optimized for the 3 bucket separation, i.e. our current setting.
7. Yellow orbit doesn't look nice. We may have to do a ramp without feedback to correct the orbit along the ramp and then back to feedback ramp.
8. The RhicOrbitDisplay and OrbStat don't agree on the rms. According to the OrbStat, the V rms is above 1mm above transition, but orbitdisplay showed otherwise.

9. Two BPMs peaking up above 10mm are not taken into account by RhicOrbitDisplay but, probably, accounted in the OrbStat (Vadim).

Opscritical as per Angelika:

I copied the final settings from last night for the blue collimators into dataset 1. The old setpoints are stored in (goto) dataset 2 and can be used if 1 is too far in on our next attempts. It would be beneficial to try it out once during the day before we want to hand it over to physics.

During the evening and overnight:

First successful back-to-back stores for Physics (Fills 9287 and 9288).

Fill 9287 (56x56):

1. 0.880×10^{11} deuterons per bunch at RHIC injection.
2. 0.892×10^9 gold ions per bunch at RHIC injection.
3. Blue ramp efficiency 91.2%; Yellow 85.4%

After fill 9287, Todd adjusted tune yellow tunes at snapback and horizontal chromaticity at snapback, t40, gammat1, beta5, gammat2, gammat3.

Fill 9288 (56x56):

1. 0.911×10^{11} deuterons per bunch at RHIC injection.
2. 0.930×10^9 gold ions per bunch at RHIC injection.
3. Blue ramp efficiency 93.5%; Yellow 93.1%

Looking at the BeamDecay.mon plots at injection for fill 9287, it is confirmed that with the new longitudinal alignment of blue and yellow bunches we no longer see blue beam affected by injection of beam into yellow (see Vadim's 19:23 entry in the Tue 27 Nov rhic-dau-2008 elog). This removes the urgency for doing tune measurements along the bunch train at injection (as proposed by Wolfram) to look for effects of electron cloud.

5 Mon 26 Nov

During the early morning (Brian van Kuik):

Shortly after 2 am, a 37x37 store (ramp 9272) was put up for Physics. (A 56x56 ramp had been attempted but failed.)

During the day (as per Nick Kling and Yun Luo):

Experimenter setup ran for the first 2.5 hours of the shift with a store from the previous shift. This store was dumped early to facilitate an emergency response into 10 o'clock to investigate a smoke alarm in the ring. The offending smoke detector could not be located easily so the system has been bypassed until Wednesday.

The remainder of the shift was pretty much a wash due to several controls and power supply failures. As of the end of the shift all of the failures of the day are resolved and we are preparing begin the ramp development planned for the day today.

As per Yun:

1. John Morris' filtered replay file helps the tune dips in the beginning of ramp and is left in.
2. Blue rebucketing was checked and fixed by John and Peggy. Rebucketing timing was adjusted by Mike Blaskiewicz.
3. Blue coupling at t260 and flattop was almost fixed; further correction was put in but not tested.
4. Todd added Artus measurements before accramp and timed DX BPMs.
5. Increased blue vertical tunes totally by 0.006 at t40, gammat1, beta5. If this does not help the loss in the beginning, please remove.
6. Yellow BBQ tracked the tunes on the last two WHOLE ramps.
7. Yellow H chrom increased by 1 unit at t260 as suggested by dejan.
8. Roger C worked a while with IPM at store.
9. Shortly after 3 pm a 54x54 store (9275) was put up for experimental use. The intensities at RHIC injection were 1.02×10^{11} deuterons and 0.667×10^9 gold ions per bunch.
10. Angelika optimized collimator positions (new goto positions) in blue and yellow.

11. Vadim setup automatic orbit correction on the ramp:

“Since we start regular stores, we should start doing the ramp orbit correction (Ramp Correction item in Orbit menu option of the Rhic Orbit Display). This correction should not be done after every fill, but when the orbit data are collected within the appropriate time window. The Tape Sequencer is set up to tell you when to do this orbit correction, while at the injection, or when to avoid doing it.”

We declared Physics (machines ready to deliver stores for Physics) at 4 pm today. We are now in a mode where the day shifts are to be used for machine development, and the evening and owl shifts are to be used for physics stores.

During the evening (as per Chris Naylor):

Experimenter Setup ran for 3.28hrs with a 56 bunch store (9275) that ended prematurely with a Quench Link Interlock in the yellow ring.

Gregg H. notes that: “The Yellow Link tripped due to the 8b-qd2-quench detector signal Y7QDQ8-VT but I don’t see a power supply or QPA problem at the moment. Beam loss in sector 7 does not seem to be the cause. Need to investigate further. Then, as MCR recovered, another QLI occurred in yellow where y2-q89-ps tripped on a DC Overcurrent. Don Bruno is investigating this cause as of writing.”

A second attempt at a 56 bunch store (9277) failed just before flattop as a result of a loss monitor pulling the Permit Link and an ensuing Quench Link Interlock in the yellow ring. (The intensities at RHIC injection were 1.15×10^{11} deuterons and 1.03×10^9 gold ions per bunch.)

Don Bruno notes that: “y2-q89-ps tripped the link on a DCOC. I tried to have CAS reseal some cards and then I ran it by itself. On the way from -270A to -277A it tripped on a DCOC again. I had CAS turn off the circuit breaker and swap out the voltage regulator card because the voltage was not behaving causing the DCOC, When I ran it the second time I took it up to -277A and it did not trip on a DCOC. MCR ran a hysteresis ramp and y2-q89-ps did not trip on a DCOC.”

As of the end of the shift, we are ramped to zero while power supply personnel investigate the source of the Quench Link Interlock.

6 Sun 25 Nov

During the early morning (as per Travis):

Machine setup ran for 3.2 hours followed by 8.8 hours of Experimenter setup using a single 68x68 bunch store (9259) that continues in the machine.

During the day (as per SY Zhang and Vincent):

1. Vincent did vernier scan for IP6 and IP8.
2. After resolving the Blue loss and Yellow bunch problem, we had 78, 87, and 93 bunch ramps (9261, 9262, 9263).
3. The bunch intensity for these fills are
 - (a) Blue 0.88e11, 0.82e11, and 0.89e11, and
 - (b) Yellow 0.71e9, 0.61e9, and 0.58e9.
4. Collision rate of 9261 is the same as 9244, but 9262 and 9263 are lower, due to lower bunch intensities.
5. There is no vacuum problem, but Blue rebucketing looks like a problem. The slow loss of Blue at injection needs also to be improved.
6. Angelika called for collimation work.
7. Mei came in to do optics measurements.

During the evening (as per Waldo):

1. At the beginning of the shift, Angelika confirmed the yellow collimator was working correctly, and then Mei took orbit data at store in blue.
2. Raising the vertical chromaticity helped the lifetime in blue at injection.
3. Next we investigated the loss in blue which happens just prior to acceleration. Vincent ran the up sequence, but stopped it when it asked about yellow tune feedback.

4. We found that the blue **main** quad current has a momentary excursion when the blue main quad **trim** current shifts prior to acceleration. Note that this shift of the trim current is different with the replay on than with the replay off.
5. Rebucketing in blue is not nearly as good as last night. The bunch area is too big before rebucketing.
6. We tried to repeat SY's 93x93 ramp, but we did not do any better with the luminosity.
7. The highest luminosities were for a 78x78 bunch ramp during SY's shift. We attempted to ramp with 78x78, but were unsuccessful getting SY's luminosity: the first fill had a low yellow intensity at injection, and the next attempt tripped loss monitors about 270 s up the ramp. A 56x56 bunch ramp failed at 270 s as well.
8. Also visible: the Blue beam lifetime at injection gets worse with larger number of bunches (Wolfram).
9. Brian vK reverted to ramp 9267 for another try for physics with 56x56. This again failed and decision was made to go to fewer bunches (37x37).

7 Sat 24 Nov

During the early morning (as per Travis):

Machine setup ran for 1.5 hours followed by 7.75 hours of Experimenter setup using a single 56x56 bunch store (9252) that continues in the machine.

During the day (as per Vadim and Vincent):

1. We have edited the automatic orbit correction (that happens at the beginning of store) script to operate on the current ramp. The automatic orbit correction step in the Up sequence has been re-enabled (unskipped).
2. Blue Landau cavities were set up. No bunch dancing observed after that.

3. Store: orbit correction and decoupling in both rings. Local IR8 orbit angle adjustments.
4. Separation bump at IR10 in Yellow has been increased by 3 mm at the injection.
5. Blue horizontal instability was cured on the ramp by chromaticity adjustments.
6. The effect of Blue beam lifetime deterioration during Yellow fill was studied with 56 bunches. This time we did not see much lifetime deterioration when the beams were completely longitudinally separated. The Blue lifetime is also stays good enough when the beams are colliding exactly at the IR center.
7. 15:57 Oscillations of the beam decay while the longitudinal phase between the blue and yellow beams changes. Decay minimums corresponds either to collision exactly at the center of IRs or to complete longitudinal separation (no beam-beam). At the end the beams are left at complete longitudinal separation(no beam-beam).
8. Setup was delayed by a spuriously interlocking chipmunks, which was replaced, and a cryo communication error that prevented temperature readings from the 4 o'clock sector.
9. Tandem is looking for a minimum two hour block when beam is not being used so that they can condition foils.

During the evening:

1. Mei Bai did optics measurements in yellow at injection and store.
2. Christoph Montag worked on the chromaticity jump:
“Finished the chromaticity jump test. The different sextupole settings did not make a difference in the chromaticity, though I expected a change by -4 units with the modified setting in the ”after gamma-t” polarity. Don’t know why this fails. Artus tune peaks looked quite good, so I don’t think the measurement is to blame.”
3. A 6x6 ramp was done for Star vertex check.

4. Comments from John Morris regarding tune jumping at start of ramp in blue:

“I thought this jumping of tune at the start of the ramp was well recognized. I may be restating things that people already know but... The tune jump happens whenever the current blue replay file is used. It doesn't usually cross the .25 resonance but the jump is always there. Ramps without replay have tune swings on the rest of the ramp but don't have the jump at the start (e.g. evening ramps on Nov. 20). I can think of three strategies to eliminate the jumping:

- (a) doing new feedback ramps to get a replay file that does not have large tune corrections at the start of the ramp;
- (b) filtering the replay file to take out early corrections;
- (c) modifying FEC software to phase in any corrections at the start of the ramp.

These all probably require some level of expert involvement so just **adjusting the starting tune to keep the jump in an acceptable region is probably the best strategy for the rest of the weekend.**”

5. **By 23:21 a 68x68 store (9259) was cogged and collimated for experimental use.**

8 Fri 23 Nov

During the early morning (as per Brian van Kuik):

After the beam came back we gave a 56x56 beam (ramp 9247) to the experiments at 1:45am (Joanne).

Experimenter Setup ran for 5.2 hours this shift with 4.4 hours of Machine Setup. There was 2.4 hours of downtime due to a hung PLC which caused the Blue quench permit to be pulled.

During the day (as per Waldo):

1. Todd got DX bpm's timed in for IR's 6, 8, 10, and 2.
2. STAR complained that yellow background rates were an order of magnitude higher than the day before.

3. I examined vacuum signals during the shift and from LogView to see if there were any really big indications of possible electron clouds to explain the higher background rates. I cannot say that I found anything definitive here. The background rates in STAR seem to be more of a collimation problem with shifting orbits around PHENIX.
4. John Butler got the cavities (BS2 and YS3) back on and we had a successful rebucketing on the following fill.
5. PHENIX turned off their magnets and took data at the end of the overnight store.
6. STAR got their TPC on and took data for a few minutes.
7. When I talked with John Butler earlier, he said that his understanding was that we would NOT be using the Landau cavities this year. Apparently the cavities need to be changed (stretched or squished) to shift their resonant frequency, since they presently operate too close to the beam frequencies. (Thomas Roser: I think we always use the Landau cavities only above transition. This works for all ions.)
8. Joe Saetta replaced the driver for the yellow V1 collimator motor. Initial checks show that the motor now holds position with the lock off.

During the evening, and overnight (as per Travis):

Machine setup ran for 1.5 hours followed by 7.75 hours of Experimenter setup using a single 56x56 store (9252) that continues in the machine.

Various items such as dx heaters on cfe-10a-ps3 have been intermittently reporting comm failure throughout the night ever since doing a soft reboot on the front end. The alarms clear on their own.

The C3 inflector tripped off this shift. After restoring it was necessary to run the supply at its full voltage to restore beam deuteron beam; for several minutes the setpoint required to maintain injection drifted considerably. After mode switching to gold to fill RHIC and returning to deuterons it became consistent again. This is very similar to behavior seen last week after a trip.

9 Thur 22 Nov

During the early morning (as per Travis):

Experimenter setup ran for 7.25 hours this shift with a single 68 bunch store (9234) that continues in the machine.

During the day (as per Christoph):

1. We adjusted the yellow vertical chromaticity around transition by increasing it by 3 units. Together with raising the yellow octupoles to -6 units this resulted in the instability after transition disappearing.
2. In turn, the luminosity scaled with the number of bunches when we went from 37x37 to 56x56.
3. Rebucketing is still rather messy, with lots of beam in neighboring buckets. This is most likely due to bunches longitudinally "dancing" on the ramp; the Landau cavities would improve that.
4. We had problems with BS3.2 not coming on properly at rebucketing; it was locked out to prevent it from messing up the beam. (YS3.3 also locked out?)
5. Blue and Yellow are somehow talking to each other at injection. Though they are very well longitudinally separated, the blue lifetime clearly suffers when yellow is injected. As a test, we removed the yellow separation bumps at injection, which made this situation even worse.

During the evening (as per Joanne):

1. Tried to tune up the ramp with tune, chrom and orbit corrections;
2. Totally 6 ramps were made with 37, 56, 68 and 87 bunches;
3. Tried with a 37x37 ramp with reduced intensity and got the best rebucketing of the day. So, it looks like that is single bunch effect.
4. Tried a 87x87 ramp and lost the blue between stone 19 (t260) and 20 (flattop).
5. Todd did timing in DX BPMs at the experiments;
6. Contacted Angelika. She will do Vernier scan at a physics store.

7. Lost the beam (at store) for 2 hours and 40 min due to Quench link mis-communication;
8. After the beam came back we gave a 56x56 beam to the experiments at 1:45am.

10 Wed 21 Nov

During the early morning (as per Travis):

Machine setup ran for 2.5 hours this shift, with the final **four hours spent in Experimental Setup using a 37x37 bunch store (9225)**.

There was a beam induced quench in blue due to a bad fill pattern; the fill pattern was not noticed until we tried to cog the beam to collision. Upon ramping down the abort gap was mistimed with the abort kicker.

There was also a short down period to investigate losses on G10 that were pulling the AGS permit link during higher intensity deuteron operation. After consulting with L. Ahrens we decided to lower the beam intensity for the evening. The sporadic loss patterns should be investigated during the day. The mux signal for the H11C bump is not working.

As per Waldo:

There were some inefficiencies in the AGS at the beginning of the shift, so we didn't get a store (9225) up until about 2:40 am.

There was no rebucketing, collimation or gap cleaning during this shift.

Around 6 am we noticed increased losses in yellow which appeared to be related to excursion errors in the yo8-qd1, yo8-qf2, and yo8-qd3 power supplies. Beam was dumped (fill 9225) just after 7 am with a **quick turnaround (less than 30 min) to another store (9226)**, but the yellow ring decided to dump thirteen minutes later. The alarms stated that yi7-tq5 had a quench.

During the day (as per Todd):

1. **SteveT adjusted the dAu80 ramp to reduce the currents on yellow q89 shunts.** We tested this with a hysteresis ramp to verify, and all looked good. We verified with another hysteresis ramp for Don and Wing. Don also worked on trim power supply issues during experimenter access.

2. Beam returned at 14:00. We ran a good 6-bunch ramp with 80% transmission in each ring. While RF were prepping to investigate rebucketing, a two-ring dispersion measurement with RhicChromaticity failed and accidentally debunched half the beam. **Yellow dispersion with the new Q89 lattice looks a lot like dispersion before the change.**
3. The next ramp attempt lost yellow beam at blue transition, and we observed strange beam frequency problems through the ramp. This was diagnosed as a leftover radial offset in both rings from the failed dispersion measurement. We reset this to zero (it is not reset to zero by tape), and rebucketed. Rebucketing succeeded but was not very clean, with moderately large asymmetric lobes on either side of the primary bucket.
4. A two-ring dispersion measurement failed and accidentally left radial steering settings in obscure places, affecting the next ramp. These settings should be zeroed by tape for every ramp, as the radial steering functions are.
5. Blue beam appears to jitter a bit between bunches as seen on the Labview WCM display.

During the evening (as per Mei):

1. We spent the shift on optimizing the beam lifetime at store after rebucketing in collision.
2. We also **increased the number of bunches to 68x68**. The last ramp, we also **increased yellow bunch intensity to 0.8**.
3. Angelika came in and made the **collimations in both rings operational**. **Gap cleaning in both rings are also in operational mode**.
4. **Rebucketing** work was done at the beginning of the shift. Both worked beautifully with 37x37. However, **when we went to 68x68, blue became worse**. This needs to be investigated by the RF experts.
5. We tried to tune the blue beam at injection to:
 - (a) reduce the tune difference to the target tune to see whether we can ease the beam loss from accramp to snapback;
 - (b) improve the beam lifetime at injection.

Both failed. Blue really doesn't like to get to the (0.22, 0.21).

John Morris comments:

As long as the current replay file is used, I don't think there is anything to be gained by getting the injection tune close to target tune for the start of ramp. When the replay data was saved, a significant tune correction was needed at injection. Whenever you use that replay file, it is going to apply that same correction. At some point I think a new blue feedback ramp is going to be needed - a feedback ramp taken on a ramp with the injection stone at a good place so that the corrections are small at the start of the ramp.

11 Tue 20 Nov

During the early morning (as per Angelika):

We spent a couple of hours at first with decoupling of yellow. Yun came in, Al covered BBQ and we tried a tune feedback ramp which failed. Yun's best guess from yesterday made things significantly worse and we ended up reverting those settings which gave us enough room to bring yellow up with 37 bunches (and it's probably good for more).

With beam at store I started working on collimators. Yellow got pretty much set up and I used the goto setpoints in 2 consecutive stores successfully. Blue is not yet finished but the goto setting (81) gives some improvement for now. I had problems with the default settings in the store panel the collimator application came up with. I will address this tomorrow (well, later today) with Wenge. I lost 2 stores that way and kept the 3rd one in the machine and called experiments. They claimed that they could still make use of it. Transmission efficiency was consistently close to 90% in both rings. The last ramp had yellow with about 93% but also had a much lower intensity.

(As per Travis):

Machine setup ran for 6.3 hours this shift. Work focussed on ramp development with the experimental magnets at full field and collimator setup. The cog to collision sequence is not fully operational; it is necessary to manually fine cog the beams before resuming the tape sequence. Also, when the vertical separation bumps are removed there is a TAPE error reporting that the live ramp activate failed; the ramp is activated and the bumps are removed. Initial rates at PHENIX for 37x37 bunches are

around 23K.

During the day (as per Fulvia):

This shift inherited a 37x37 store from the owl shift that was used for the following activities:

1. Experiments setup until 9:30am.
2. RF work for rebucketing: yellow phasing, test of rebucketing (RF group).
3. Fixing of the blue clock V124 module for Phenix (Rob, Waldo).
4. Gap cleaning set-up (Greg): it worked very efficiently in blue, slower in yellow.
5. Dispersion measurements in both rings at store (Todd).
6. Dispersion measurements in yellow at injection (SteveT): they match the model well (as opposed as store).
7. A 6x6 store followed for continuation of RF rebucketing set-up. Phasing of Yellow cavities was done this morning but Blue phasing from yesterday needed to be repeated (not reproducible). Activity in progress at shift's end.
8. The test of drift correction (JohnM, Wolfram) is moved to the next shift.

As per Chris Naylor:

Experimenter Setup ran for 3.58hrs and Machine Setup ran 3.42hrs this shift. RF personnel performed cogging and rebucketing work. Dispersion measurements of both beams were taken at store. Dispersion measurements of just the Au beam were taken at injection as well. Gap Cleaning was successfully performed in both rings. Access Controls personnel performed interlock checks of the LINAC chipmunks. As of the end of the shift, there is a six bunch store for RF personnel to continue work on cogging and rebucketing in RHIC.

During the evening (as per Yun):

1. RF rebucketing work continued.
2. Shift correction at injection tested by Wolfram and John Morris.

3. Carl's replay files checked.
4. Yellow coupling corrections between t140-t260 done in parallel.
5. 37x37 bunch ramp for collimation work. (No collimation work was done.)
6. No yellow feedback ramp because of yellow BBQ problem.

As per Don Bruno:

I was speaking with Steve, Dejan and John Morris and we noticed that the q89 limit of 275amps is being exceeded. Some are going up to 290amps. We are not sure yet what happened to the wfg limit but John said he would look into it. I know the ramp cannot be changed tonight. I also heard MCR was going to try and put up an 8 hour store. I asked the coordinator to put up a 4 hour store at the most. Come back down for 15 min and then put up another 4 hour store. I am hoping this will help the q89's for tonight. This would be for equipment protection.

12 Mon 19 Nov

During the early morning (as per Christoph):

1. In the previous shift, Vadim had adjusted the yellow bend trim. This required adjusting the tunes; we did the fine-tuning while successively increasing the number of bunches. We got 68 bunches with about $0.7e9/e11$ intensity to flattop; at 78 bunches we got a quench. The reason for this is still unclear and should be looked at by Don Bruno.
2. In the yellow ring the tunes wiggle between stepstones. This needs to be ironed out by either tune feedback or by adjusting the slopes at the stepstones.
3. There also appears to be lots of coupling in Yellow, especially around transition. We contacted Yun about his, but since there was no BBQ support after midnight, and turning on STAR and PHENIX magnets will change the coupling anyway, he strongly recommended to defer decoupling until after the experiment magnets are up and running.
4. The gamma-t delay in Yellow was adjusted to decrease the longitudinal quadrupole oscillations after the jump. Items remaining

to be done require experts: experimental magnets, decoupling, rebucketing, and collimation.

During the day (as per Mei):

1. Blue storage cavity phased in.
2. Angelika checked the yellow collimation system at injection.
3. Ring access for experiment magnets (in preparation for bringing them on), RHIC collimation system, abort kicker, one blue tq ps and various other systems.
4. The 6x6 ramp before the access had yellow beam debunched right at accramp due to the failure of the RF loop. However, there wasn't any warning/error message for the operators to know the phase detector was not functioning properly so that we can pause the ramp.
5. There were about 8 blms from three different FECs went to LOSS state while we had blue beam at store. The strange thing is the permit stayed up. This is the first time, this happend. Currently, Ron is investigating this problem.

During the evening (as per Todd):

1. One ramp: blue had 95+% transmission for non-Artus bunches with experimental magnets on; yellow immediately debunched when RF loops closed.
2. Lots of repairs with THREE separate ring accesses.
3. Blue abort kicker issue related to electrical problems with smoke detector circuit kept us off several hours, requiring ring access to diagnose.
4. yo8-tv5 (part of the yellow vertical IR8 separation bump) failed and required ring access and replacement.
5. Intermittent Quench Ground Current Warnings were investigated by Carl.
6. ya2 tripped several times and required a ring access for QEI replacement.

7. Yellow RF phase detector did not work, and yellow beam debunched when ramp loops closed during our single ramp attempt; at end of shift Tom Hayes believes he has fixed the problem in 1004.
8. AtR transmission problems in yellow required retuning near end of shift.

13 Sun 18 Nov

During the early morning hours (as per Nick Kling):

Ramp development progressed for the majority of the shift.

1. Tune feedback and ramp replay was successful in the Blue ring but did not work in Yellow though it was only attempted one time.
2. After feedback work was completed our efforts focused on pushing the number of bunches per ring and establishing collisions at star and PHENIX.
3. As of the end of the shift we have ramped 37x37 bunches with 90% transmission efficiencies. This resulted in initial rates of about 18kHz on the PHENIX and STAR ZDCs.

And from SY and Alexei:

With minor changes, we used replay for Blue only, and ramped a 12-bunch, 28-bunch, and 37-bunch fills for collision.

Fill 9179 with 37 bunches, $0.7e11$ deuteron, $0.6e9$ Au per bunch had PHENIX ZDC 15 kHz (need to check out), STAR a little lower.

After that we tried to improve the Yellow loss before the transition, adjusting the chromaticity in both ways, but not successful.

Here is a summary of the ramps:

Ramp Feedback Status: Blue=Replay, Yellow=Off

Blue ramp efficiency: 90.8%, Yellow ramp efficiency: 85.9%

Blue ramp efficiency: 91.5%, Yellow ramp efficiency: 86.1%

Blue ramp efficiency: 91.7%, Yellow ramp efficiency: 83.6%

Blue ramp efficiency: 90.1%, Yellow ramp efficiency: 82.5%

Blue ramp efficiency: 92.2%, Yellow ramp efficiency: 86.1%

Blue ramp efficiency: 90.4%, Yellow ramp efficiency: 84.4%

During the day (as per Mei Bai):

1. We spent the first couple of stores including the one we inherited from the previous shift to exercise the coggng beam to collision, steering with LISA, beam lifetime optimization with beam in collision.
2. We spent most of the shift to working on the radial excursion around transition in Yellow by tweaking the bend trim. Moderate progress was made and the Yellow transmission efficiency through transition is improved. (Blue ramp efficiency: 93.4%, Yellow ramp efficiency: 88.3%)
3. We also contacted both Steve Tepikian and Pete Cameron about the Yellow tune path for the Yellow BBQ tune tracking. Steve loaded the tune path around the lunch time. We didn't know this was loaded until couple of hours later. Steve did put an entry in the Elog about this. But, in the future, would be great if one can call MCR to let the crew know that different settings for the live machine will be loaded.
4. Another problem we encountered was this time shift of the orstat relative to the stones. We were tuning the radius without knowing there is a time shift until we found later on the radial change went to the wrong direction. It took us quite a while because we first thought we made a mistake in our calculation and spent another ramp to verify. Would be great if this bug gets fixed.
5. The Au bunch intensity started around $0.6 (\times 10^9)$ at the beginning of the shift and then got deteriorated to 0.2 to 0.3. The operations had to spend some time for the last fill to bring it back up to 0.45. It seems the BtA efficiency really went bad.

During the evening (as per Vadim):

1. We continued (from previous shift) and more or less completed Yellow radial orbit correction, using bend trim.
2. Blue horizontal chromaticity adjustments before the transition.
3. Two ramps with tune feedback in Yellow. First of them was mostly successful (excluding data from first 4 stones). Experts can check if those collected data can be used for the replay.

Ramp Feedback Status: Blue=Replay, Yellow=Off

Blue ramp efficiency: 95.5%, Yellow ramp efficiency: 89.1%

14 Sat 17 Nov

The early morning hours were spent repairing the vacuum leak that developed (again) at L05. Vacuum personnel came in and replaced the seal at L05, pumped down, and found that there was still a leak. The area was then sprayed with sealant and the pressure finally began to go down. But during the morning the vacuum did not recover completely. It was then found that the Ion Pump at L07 had tripped. This was turned on and the pressure again began to go down, but the vacuum again did not fully recover. Vacuum personnel were called in again to do a leak check in the AGS ring. They found a leak at the L07 bleed-up valve which they fixed by blocking the bleed-up port with a flange. The AGS access was completed by 18:10. The LOTOed AGS devices were brought back on at 19:00 but the L10 cavity (used for the merge) in AGS would not come back on. RF personnel were called in to bring it on. It was back on at 20:10.

Angelika's Shift:

We could not try yesterday's ramp again because we could not get Au beam into RHIC (AGS vacuum issue). We did:

1. Play some with blue collimators and found some problems (we are currently addressing). At first glance it looks like that there's not much halo present at injection for d.
2. Fill 60 and 120 bunches into blue. No signs of pressure bumps but only 0.6×10^{11} .
3. Change setpoint trap threshold for the RMMPS (in preparation for more tune feedback ramps): Carl
4. Add limit to RF wfgs to prevent RF trips between park and injection: Larry

AGS vacuum did not recover so we had no yellow beam to work with. At the end of the shift AGS is being opened again for vacuum to go in and work on the leak.

Waldo's Shift:

The first half of the shift there was no beam because of the L10 vacuum problem in AGS.

1. We then filled both RHIC rings and had a successful ramp in both rings; although we did not do the deuteron merge in the AGS since the L10 cavity did not come back on. Daryl Goldberg came in and got the L10 cavity back on.
2. Yun, Larry, and Ron Schroeder came in to do ramps with feedback. **The next ramp had successful feedback in blue (blue 90% efficient).**
3. Replaying in blue on the 3rd ramp, we lost a chunk of beam just prior to accramp when Qx jumped across 0.25. The yellow lost lock when we tried tune feedback.
4. We attempted a 4th ramp with beam just in blue, but lowering the tunes at injection before the ramp. There was still a shift in the tune right at accramp, but we did not lose any substantial beam in blue until later, when the yellow gave a QLI; we had forgot to turn off the yellow feedback. (Doh! Feedback definitely won't work without beam in the ring.)
5. We need to figure out how to set the tunes correctly at the injection stone for replaying the ramp.

15 Fri 16 Nov

During the early morning hours the AGS vacuum leak was found to be on a flange at the downstream end of the L05 straight section. The Kapton insulation on the catwalk side of the beampipe is badly scorched indicating significant beam losses there. Vacuum personnel sprayed the area of the leak and the vacuum began to recover.

Access controls problems further delayed beam coming back on in the machines.

During the day (as per Vadim):

1. Ramp Tuning:
 - (a) Yellow ramp efficiency considerably increased (mainly due to tune adjustments done at the end of Mei's shift).

Blue ramp efficiency: 84.4%, Yellow ramp efficiency: 73.7%

- (b) Orbit and tune improvements at various stones in both rings.
- (c) Chromaticity measurement on the ramp with wiggles and then the chromaticity adjustments along the ramp.

Blue ramp efficiency: 85.5%, Yellow ramp efficiency: 86.8%

2. Store Work:

- (a) Chromaticity measurements and correction at store. Using radial shift up to 2mm allowed to get good data also on nonlinear chromaticity.
- (b) Yellow dispersion measurements show some disagreement with the Model (Steve).
- (c) Coupling angles are measured. (Yun)
- (d) First collision were observed (800 Hz at Star and Phenix) by Wolfram, Greg and Yun.

During the evening (as per Christoph):

1. Yun, Larry, and Ron worked on closing the tune/coupling feedback loops. This worked in both rings.
2. Afterwards we attempted feedback ramps in yellow but failed. Larry will analyze the data.
3. The chromaticity jump test at injection could not be performed for several reasons. First of all, the chromaticity measured by ARTUS jumped by several units each time it was measured. Furthermore, we had problems with the RampEditor/OptiCalc again. The tunes displayed in the RampEditor changed by 0.1 when the gamma-t quads were set at injection, though the measured machine tunes changed only very little. Obviously, I didn't want to activate such a ramp, so I had to give up. This needs to be looked at by Nikolay.
4. Afterwards we worked on ramp transmission with the ultimate goal of increasing the number of bunches. Couldn't get the transmission better than 80-85 percent (for non-ARTUS bunches), with no smoking gun yet.
5. Blue ramp efficiency: 74.9%, Yellow ramp efficiency: 84.6%

6. There seems to be some coupling, so I tried to separate the tunes some more, but that didn't make a difference. Ramp orbit correction didn't help either.
7. At 23:15 noticed that vacuum leak had developed again at L05 in the AGS. Beams are off until this is repaired.

16 Thur 15 Nov

During the early morning as per Angelika:

Shift began with a controls failure. We had 5 ramps, one got up to store (9134). We focussed on yellow, blue had a consistent 80% transmission. At store we took horizontal optics data and lost the beam when we tried vertical. Two ramps failed before transition. That could be connected to a low level RF problem and got fixed when the phase reference got reset to zero. Orbit corrections in yellow work in the horizontal plane up to flattop (best corrector and SVD). RMS is below 2 mm everywhere. We have a problem with vertical though. Vertical is corrected up to t230 (with best corrector) where the model is corrupted. Trying to interpolate failed and orbit got worse. We reverted to the successful ramp 9134 (though the orbit is far from perfect there—but it's below 4 mm RMS). At the end of the shift we try to re-anchor t230 which fails because of a ramp manager error which we are investigating now.

During the day as per Waldo:

It appears that we may have applied a double orbit correction at the t260 stone early in the shift. Vadim fixed the stone settings again. The yellow rf did lost sync during the next ramp after the second stone on the next ramp. There were a few hysteresis ramps trying to debug an rf problem causing trips. Several more ramps failed while trying to debug the rf sync problem.

Finally fill 9145 had yellow beam to the end of the ramp. Orbit and tune correction blew the yellow beam away at store.

Carl Schultheis installed new software to monitor the main busses for the yellow quad buss, and both blue main busses. The next test hysteresis ramp failed in blue with a quench link event about 1 s after ev-ygammat. There were a couple of glitches in the BlueDipoleCurrent Gpm display later after the blue QLI.

Vadim noticed that the t243 was not interpolating V-STEER correctly for yellow even though it is not anchored. For some reason the RampEditor is displaying values identical with the t40 stone! He has gone to talk to Steve T. about this. This may be part of our problem with the vertical orbit going BOING there.

During the evening as per Mei Bai:

1. Carl finished his ps work at the beginning of the shift.
2. Freddy also put in the new scaling factor for the RF code.
3. Vadim also confirmed y8-tv15 polarity is wrong. This corrector was then put to standby. He also put y3-bv8 to service because he suspected this bpm has large offset.
4. Tweaked store frequency to center both beams at store.
5. Fixed the yellow orbit at store and did decoupling.
6. Measured the yellow dispersion at store as well.
7. We spent most of the shift in tuning the ramp. Blue transmission excluding the Artus bunch is pretty good and should be ready for more bunch ramp. We tweaked the yellow tunes at t243 and t260 and also corrected orbit at t260 and removed the beam loss at this location. However, the losses at transition in Yellow still persist. We think we understood this is due to the H tune gets to 0.25. However, due to Mei's mistake, we forgot to put in the tune changes before our last ramp in this shift.

AGS developed vacuum leak at L05 around 10 pm. This significantly degraded gold transmission efficiency. Started putting LOTO on AGS for Access around 11 pm. Vacuum personnel (Victor Usack) arrived around midnight.

17 Wed 14 Nov

During the early morning (as per Vadim):

Ramp development with dAu82.

Straightened Blue tunes on the ramp. Initial chromaticity adjustments have been done on first part of the ramp to reduce losses.

Yellow tune adjustments on the whole ramp.

Yellow bend trim adjustment at the transition (γ_{4}) to reduce radial orbit jump.

IR separation bumps installed.

Blue store adjustments: orbit correction, tunes.

Blue ramp efficiency 74%; Yellow 55%. After transition, yellow transmission is close to 100% except for the tunemeter (Artus) bunch.

Problems observed:

Yellow orbit correction on the ramp did not work well.

Yellow losses on some of the ramps correlated with suspected problem in ring-to-ring synchro.

During the morning Christoph Montag found that the voltages Don Bruno came up with for the yellow gamma-t supplies do the right thing.

During the afternoon Don Bruno and George Ganetis informed us that the new ramp (dAu82) is not acceptable. We must go back to the old ramp (dAu80), keeping the changes Steve Tepikian put in to remove the radial excursions in yellow. (It turns out that slowing down the beta squeeze is what made dAu82 unacceptable.) Don and George needed about 4 hours to go back to dAu80 and tune it to make it acceptable. During this time Todd Satogata copied the changes made in dAu82 over to dAu80. Peggy Harvey, Freddy Severino, and Keith Zeno worked on RF loops with gold in Booster. STAR was also able to do testing on their magnet.

During the evening, there was one good ramp with 81% efficiency in blue and 55% efficiency in yellow. The tunes were reported to be changing opposite from the direction intended by changing setpoint.

18 Tue 13 Nov

During the early morning (as per Waldo):

During the night, we worked on improving the Blue ramp. Ramp 9106 had a 68.7% ramp efficiency; a good chunk of the loss was the bunch kicked out by ARTUS.

1. Lowered horiz chromaticity after transition and before the gammat jump by 1 unit. This helped slightly.
2. We uncrossed the tunes below and around transition. There seems to be some coupling which needs some work.
3. We flattened the tunes a bit more in the later ramp; in particular, the vertical tune was crossing 0.2.
4. The orbit rms gets quite large just after transition and again around t130. I applied a horiz orbit correction at gammat4 for the next ramp. If this makes things worse, then the horiz correctors for that stone should probably be reverted.

Problems:

1. We could not ramp yellow due to a bad DAC which must be fixed—today I hope.
2. The permit link at 1006B was getting spurious trips on channel 1 (PASS div A). A board was replaced and a loose cable was reseated. Hopefully this fixes the problem.
3. The F6 septum in Booster had to have a 24V power supply replaced.

During the day (as per Angelika):

1. Yellow DAC board was replaced.
2. Water leak in 912 was repaired.
3. STAR had an access.
4. Orbits were corrected at t230 and t260 stones. OrbStat RMS are larger than the RMS calculated in orbitDisplay. Hchrom was increase by +1 before transition.
5. We found some problems with the orbit correction:
 - (a) load data by stone (already known), Vadim is working on
 - (b) order of correction affects result with best corrector and SVD (Vadim is working on)

- (c) RMS value is unreliable when RMS is VERY small (Vadim is working on)
- 6. The following BPMs should still be disregarded (check if they are): b07-bh10, bo10-bh4, bi9-bv6, according to Todd b07-bh10 is in SERVICE mode
- 7. We lost 2 ramps after enabling the yellow RF in the permit, is disabled now but needs to be enabled again when we run with yellow beam again
- 8. We changed slow factors for ramping to and from park from 8 to 4. At the end of the shift we have beam at store and Yun starts working on measuring the angles for decoupling. One attempt to close the tune feedback loops failed because no desired tunes were set and Qtrims tried to ramp to 0 (changed now but needs to be checked that there's a good value in).

During the evening (as per Todd):

Accomplishments:

Started the shift with blue tune/coupling feedback testing and BPM testing. Yun and Al finished coupling correction phase measurement at store for blue.

We returned to injection and attempted to test coupling and tune loop closure in the blue ring at injection. This seemed to fail, and later evidence indicates that there is possibly some confusion between correction families.

Steve gave us dAu82, the new ramp with yellow frequency correction and the slowed last stones for the blue q89 quench detection problem. John Morris vetted this ramp, and we combined the rings for ramp development with dAu82.

dAu82 started with odd yellow tunes at injection. These were retuned, and decoupling using RhicInjection worked beautifully.

The first dAu82 ramp was accidentally run at slowfactor 1, much to our dismay. It got blue beam to flattop, and yellow beam to the third stone. Large losses late in the blue ramp due to wandering horizontal tune and a large horizontal orbit RMS. The yellow radius/frequency looked good, but the yellow horizontal orbit RMS looked bad.

The second dAu82 ramp got no beam to flattop. Still large orbit and tune excursions in both rings.

The third dAu82 ramp had large early yellow losses when vertical tune crossed 0.2, but got some beam in both rings to t243, where blue losses quenched a Q2 in 6 o'clock. We recovered and put in BLM limits in the up sequence.

The fourth dAu82 ramp had an improved yellow orbit, and still had losses late in the ramp, but got good tune and orbit measurements through almost the entire ramp, so Vadim should have a successful shift.

Problems:

Blue coupling/tune feedback loops do not close; it appears that some families are not treated properly. This should be investigated during the day.

During ramp development at 19:25, yellow beam was not extracting in the AGS. Peg Harvey, who was here, discovered that the yellow DSPs needed to be reset.

yo8-bh10 was masked because it was producing large corrector strengths.

19 Mon 12 Nov

Here is Todd's summary of the early morning activities:

Accomplishments:

1. Recovered d injection into Booster after C3 inflector problem diagnosis (Vincent).
2. RF loops tuned, including ramping loops (Freddy and Peggy). Yellow vertical orbit at injection corrected with best corrector method; worked flawlessly. Blue injection orbit problems diagnosed to be leftover want settings from ORM testing.
3. Yellow BPMs partly fine-timed; script for automatic fine-timing tested. First ramp failed in yellow because wfgmanagers were not connected. **Blue transmission about 6%.**
4. Second ramp worked in yellow to snapback stone; **blue efficiency was down to 2.4%**, with large losses in last stones. Third ramp worked in yellow past snapback stone, concluding that RF loops look okay. **Blue ramp efficiency was nearly 30%, and we had enough beam at flattop to adjust tunes, chroms, orbits.** Orbit correction performed to

well below 1 mm RMS, tunes put in box, and chroms set to about +1 in each plane. Measured dispersion is an excellent match to model.

5. Fourth ramp improved yellow a slight bit, but concluded that RF loop gains require some adjustment since the radius walked up to several mm. (This is not an RF loop problem. See Wolfram's comment below). **Blue ramp efficiency was a staggering 54%, with almost all losses before transition.** Difference orbits at store show about 10-15% residuals, or about 10-15% errors in beta functions. Decoupled blue store tunes to $dQ_{\min} < 0.001$.
6. Finished fine-timing of yellow BPMs at the end of the shift.

Issues:

1. mcr6s does not seem to dump tape ratview pictures, possibly due to problems with the virtual frame buffer on acnlin85. mcr5p does dump tape ratview pictures, so we used that for the remainder of the shift.
2. Booster C3 inflector was sometimes unreproducible, hampering mode changing efforts to switch into deuterons. Joe Saetta is in to investigate at end of shift.
3. Several yellow gammaT quads tripped off on every ramp. Yellow abort kicker power supply tripped with every store dump, pulling the permit and dumping the blue beam prematurely.
4. The AGS is regularly missing late transfers in the deuteron cycle, which makes auto-filling difficult; we got reasonable bunches by filling one bunch at a time.
5. The blue store orbit is about +1.1 mm outside. We should correct this. Yellow RF loops likely still need some work, as the yellow radius walks outside at the start of the ramp until the beam is lost.
Wolfram comment on this last issue: The Yellow radius excursion on the ramp is likely from the Yellow bend field settings in the RampEditor, not the rf loops.

During the day, a QLI in blue required that Carl Schultheiss replace a DCCT for the main dipole. An offset of 0.5 A was then found in the main

quadrupole current. A bad DAC module prevented yellow being ramped. An access is required to replace the module. This will be done tomorrow.

During the evening (as per Yun Luo):

When I came in, I was told that the mainQ current was 0.48A lower since Saturday 17:00 and was corrected now. As a result, the tunes increase by about 0.05 at injection, and about 0.005 at store. We scaled the tune shifts on the ramp and put back into RE. We had several ramps and the ramp efficiency in the last ramp is about 50%. The loss in the end of ramp was due to high vertical tunes and bad horizontal closed orbit. The loss in the beginning of the ramp probably is due to the large horizontal chromaticities. Nikolay came in to check the online optics calculation since we found the chromaticity output in RE were not acceptable after we changed tune settings at some stones. Al Dellappen was here to try to lock the tunes on the ramp.

20 Sun 11 Nov

Here is Todd's summary of the early morning activities:

Accomplishments:

1. Recovered from QLIs and corrected slow factors according to Don's prescription.
2. Worked on ATR injection efficiency for blue without much success.
3. Checked bad BPMs from previous shift; bo7-bh10 has a bad feedthrough and was set to SERVICE.
4. **Yellow was handed over at injection at about 01:15 after a hysteresis ramp.** We split into two teams, working on yellow injection and blue ORM. A single bunch circulated in blue from 02:00 to end of shift, and some initial ORM data was taken.
5. We took a fair amount of ORM data in blue, though this data is probably of only marginal use due to the low blue beam intensity.
6. **Yellow beam was injected and circulated with excellent lifetime.** Tunes were put in the box (though strongly coupled), and horizontal orbit was corrected. Injection efficiency looks good. A first (inexpert) pass at RF capture was done, and some beam is seen in the WCM,

though in bucket 40-something. We are deferring RF setup until after Don's work resumes at about 10 am.

Issues:

1. ORM analysis found a bug with the "live strengths" interface in the wfg manager. Live strengths applied were only about 55% of intended strengths. This explains some anomalies with past ORM data (for Larry Hoff).
2. We should recombine the wfgmanagers when permitted by Don Bruno (for Larry and Don). Until this is done, yellow changes must be applied by typing the ramp ID into the wfgman2 pet page and activating a "here2injection".
3. The model server does not converge with set tunes near 1/3, however this is needed to tune the blue ramp at snapback and still 5 stones. Ramp work in blue will be hampered until this is fixed (for Nikolay Malitsky).
4. Yellow vertical orbit has a 3mm RMS orbit that appears to defy correction (for everybody).

During the day Don Bruno and co-workers worked on yellow and blue power supplies. Deuteron beam was back in blue around 3:30 pm. Yun and Al Dellapenna then worked at injection. They found that BBQ worked well for chromaticity measurement but failed in tracking tunes during skew quad modulation. Yun will work on this again tomorrow evening.

Nikolay worked on the optics model in blue and yellow.

Steve Tepikian completed calculations of difference between values of gamma in yellow ramp and values obtained by locking yellow frequency to blue frequency. The difference at yellow transition agrees with what Wolfram obtained yesterday.

Yellow PS work finished around 8:20 pm. Mode switched to gold at 8:40 pm and injected into yellow.

Christoph Montag roughly timed in the yellow gamma-t quads.

Roger Lee timed in the yellow WCM.

Peggy and Freddy setup capture and RF loops in yellow at injection.

Rob worked on yellow injection damper.

21 Sat 10 Nov

During the early morning hours, Jorg and Alexei corrected the blue orbit and checked tunes, chromaticities, and coupling at injection. One quick attempt was made (by Kevin Smith and Freddy Severino) to bring on the RF loops, resulting in debunching most of the beam.

During the morning Access Control Personnel tested the flammable gas detection system. There was no beam in RHIC during this time.

During the day Yun and Al Dellapenna worked on BBQ and decoupling at injection in blue. More work is needed to track the tunes with BBQ. Peggy Harvey and Freddy Severino worked on setting up the RF loops in blue. Don Bruno and co-workers worked on yellow power supplies. Nick Tsoupas did emittance measurements (with deuteron beam) in ATR. **By 4 pm, RF personnel finished setting up beam control loops in blue.** A ramp with six deuteron bunches was then attempted. The beam was lost at transition.

During the evening, work on the ramp in blue continued after a high current shutoff test was performed in yellow. **Blue beam survived most of a ramp to store, but was aborted by accumulated losses.** Al Dellapenna notes that BBQ appeared to track tunes on this ramp. Here is Vadim's summary of the evening's activities:

1. Made several ramps in Blue.
2. After first ramp which had QLI on downramp, the tune at the injection (and obviously on the ramp) jumped down by 0.03-0.04. No reason for that was identified (pscompare does not show problems).
3. Tunes and orbit correction was done on the ramps. Beam survives presently until "t230" stone.
4. In some stones the horizontal tune correction was limited by the Model, which may be related with tune settings close to 1/3 value.
5. Couple of real quenches, one looked like beam induced, another after ramping down with wrong slowfactor.
6. Buffer and current tables for dx-d0 magnets are different. An expert (SteveT) should check what should be the value of yi7-dh0 magnet, since we changed that value while investigating the table difference. And I am not sure that we put it back correctly.

22 Fri 9 Nov

During the early morning RF personnel setup capture of deuteron beam in blue at injection. The AGS extraction field had to be lowered by 7 Gauss to give the desired frequency in RHIC at injection. Here is Todd's summary of the work done by him, Mei, and Natalia:

Accomplishments:

1. Tunes/chroms adjusted for RF capture work.
2. RF capture performed. The change in the AGS field required substantial retuning of ATR and RHIC injection.
3. 1 bunch in RHIC from 04:00 to 05:30 for BPM timing and testing while AGS opened up for A5 kicker work. About 1/3 of the blue ring BPMs have been fairly well fine-timed. Difference orbits were acquired for polarity checks and a few BPM wiring problems were found.
4. The residual between predicted and actual difference orbit is about 15% in-plane (horizontal) and about 5% out-of-plane (vertical). This is for reference for future ORM work.

Problems:

1. ATR supplies tripped on a cooling fan fault; a reset of this tower took about an hour to clear.
2. Spurious yellow QLI events occurred four times in the shift, aborting the beam each time because the blue abort kicker would fire. The root cause of these QLI events is unknown; they all originated from 4b-time.A
3. Some blue BPMs are miswired. Instrumentation will hopefully address this during the day.

At 4 am LOTO was applied to AGS for the A5 kicker work. Todd worked with stored beam (one bunch) until 5:30 am.

Shortly after 4 am, one of the modules of the F3 kicker in Booster was found to have a problem.

Modification of the A5 kicker and repair of the F3 kicker took place during the day. The F3 fix was simply the re-establishing an electrical connection that had developed a high resistance.

By 6:30 pm, access into the AGS was completed and Dave Warburton reported that the A5 kicker was working properly.

As per Keith Zeno:

1. Dave Warburton said that the A5 will take hours to condition in narrow mode, and should be left there as much as possible to facilitate this. That is not to say that Ion mode is harmful, just that it won't help towards the conditioning of the narrow mode. That said, I saw no improvement during the course of 5 hours or so in the size of the oscillations after the main pulse with the A5 in narrow mode the entire time. The undershoots that appear in these gpms were there virtually all the time during this period. Although the latter one was smaller for a time before beam returned to the machine.
2. Although there are these large undershoots after the main pulse, all 8 transfers seem to survive reasonably well, with the overall transfer efficiency about 90%.
3. There wasn't much of an opportunity to check it with gold, and so I didn't, although I did pulse it in Ion mode and didn't see anything grossly different from how it looked before the work. Although the blue module seems somewhat shorter.
4. Lowered dh5 and L20 quite a bit to improve transfer. Perhaps related to the different kicker shape and timing?

RHIC was secured for beam shortly after 9 pm and deuterons were circulating in blue by 9:30 pm.

Roger Lee timed in the blue WCM, and Rob Michnoff timed in the blue Tunemeter (Artus).

Waldo flattened the horizontal and vertical orbits.

ATR cooling tower developed a problem at 11 pm.

23 Thur 8 Nov

During the early morning hours Todd Satogata, Yun Luo, Greg Marr, and Jim Jamilkowski worked on injection of deuterons into blue. Here is Todd's summary of that work:

"Don et al left us a working machine about midnight, then confusion about the RF reference frequency and AGS cavities tripping off kept us off until about 4 AM. It took us two more hours to steer through to RHIC, and BPM rough timing took another 30 minutes. One corrector was tweaked (bi9-th5) to get a good orbit, and we easily got circulating beam with good lifetime after Greg tweaked injection kicker timing. Horizontal tune was moved down to the working point from above 0.33; vertical tune was moved down from between 0.25-0.3. TJS fixed a scaling problem by x100 in the BeamIons GPM for deuterons; end of shift unbunched injection efficiency was about 85%; ATR setup for this injection is in the 07:42 entry (of the rhic-dau-2008 elog). After this, support turned RF on and we tweaked AGS field and phase a bit without much success in terms of beam capture. It's hard to tell if chromaticities are bad or not until we get good capture, which is next on the agenda."

At the 9 am meeting, the decision was made to do the A5 kicker modifications on Friday (9 November). The plan is to start AGS LOTO at 4 am Friday so that the kicker work can start at 6 am. The work is expected to be completed by 6 pm.

During the day Keith Zeno and Kevin Smith worked on the gold setup in Booster and AGS. Don Bruno and co-workers continued work with the blue MMPS. By 6 pm they had done two hysteresis ramps from Park to Store and handed blue over with the field at Park.

During the evening blue was brought from Park to injection and circulating beam (deuterons) was established after some tuning of the ATR line. RF personnel then began to work on capture.

24 Wed 7 Nov

12:10 am D. Bruno reports that the Blue quench link tripped while using the power supply test ramp to run the magnets up to injection field.

12:20 am Power supply personnel are leaving for the night. The QLI was caused by the Blue MMPS. C. Schultheiss will have to investigate further during the daytime.

12:30 am AGS to RHIC synchro setup for both deuterons and gold has

been completed.

12:45 am The RHIC Ring has been secured for beam.

4:25 am Contacting L. Ahrens about the ATR current transformer calibrations.

5:15 am Leif helped to verify that the ATR current transformer delay settings are optimized.

5:45 am Adjusting the Blue G10 fine delay improved the FEB extraction efficiency to 83%, closer to the expected value.

6:30 am W. MacKay has LOTO'd the x arc pitching magnet to execute C-A TPL 08-03.

7:36 am Beam is seen on the XF2 flag at the end of the X arc.

Keith Zeno investigated extraction of deuterons from Booster at a revolution frequency of 925.926 kHz. This would give a bunch spacing of 540 ns on the AGS injection porch and would provide a 1080 ns gap for the A5 kicker pulse on the eighth transfer of deuterons from Booster to AGS. The Booster extraction rigidity for this setup is 4.985 Tm, some 68% of the nominal 7.322360 Tm. Looking at the four profile monitors in BTA, one sees significant jitter in the horizontal beam position. We believe this is due to poor regulation of the F6 septum magnet power supply at the lower rigidity. Because of this complication, the decision was made to go ahead (this Friday or early next week) and make the necessary modifications to the A5 Kicker PFN to produce a shorter pulse width. The time estimate for this job is 12 hours. Jon Sandberg considers the risk for breaking something to be low.

Sweeps of the RHIC tunnel commenced at 5 pm.

Don Bruno and co-workers worked on the blue MMPS during the day and evening. During the evening, a real DX magnet quench occurred when the current was inadvertently brought up to 5000 A. After recovery from this, a high current shutoff test was done at 4146 A. **The blue ring was then handed over for the injection of deuterons.**

25 Tue 6 Nov

Both rings (blue and yellow) were declared cold today. As per Dewey Lederle:

“Cooldown is complete. Both blue and yellow rings are cold and stable. All magnet temperature, re cooler level, and corrector lead flow alarms are clear. The refrigerator is stable with no issues. Power use is currently at 6.2 MW and should drop another megawatt when we start expander 7 later this week.”

Further heat load tests were done on the X and Y arc magnets.

RF personnel worked on AGS-to-RHIC Synchro.

PASS recertification work went on for several hours.

6:05 pm F. Severino reports that the RF group is done with gold AtR synchro work.

PASS functional testing for RHIC operations, and the RHIC Radiation Safety Checkoff List were completed by **8:45 pm**. Sweeps of the RHIC tunnel then commenced.

9:10 pm J. Butler reports that he is done for the night, and that the Blue acceleration cavities are set up for the new injection frequency for deuterons.

10:55 pm The RHIC blue main dipole is at 50 A.

26 Mon 5 Nov

As per Dewey Lererle (this morning): **The blue ring cooldown is complete.** The 4K cooldown of the yellow ring began Saturday and is about halfway complete. The yellow ring cooldown should be complete Tuesday. There is an instrumentation problem in sector 4; cryo is trying to find out why the temperature there is reading high.

There was much discussion today about the work required and risk involved in reducing the width of the AGS A5 kicker in the “Proton Mode”. (It is believed that the width can be reduced enough to allow 8 transfers of deuterons to AGS per AGS cycle.) Jon Sandberg believes the risk is low. Thomas Roser wants to postpone the work for a week to allow time to explore other options.

Kevin Smith worked all day and all evening on the AGS “Rev Tick Sync” (see Nov 5 and 6 entries in the AGS-RF-2008 and Booster-AGS-dAu-2008 elogs). If this could be made to work, we would be able to do just six transfers of deuterons to the AGS and then do the eight-to-four merge to yield three bunches and one empty harmonic four bucket. (Doing just six

transfers leaves a sufficiently wide gap for the A5 kicker.) The “Rev Tick Sync” circuitry would ensure that only occupied buckets are involved in the merge and that the AGS extraction kicker will not try to kick beam out of an empty bucket.

Here is Kevin’s summary of his work:

So spent today working on testing/troubleshooting the new setup required to accommodate our A5 issues. Progress made, but this is definitely gonna take more time and effort. See Booster/AGS setup and AGS RF eLog for details of status. Succeeded in getting the AU2 D setup working thru all parts of the cycle - merging one transfer into one bunch and tracking that to extraction, consistently kicking out the lead bunch. Was pretty happy about that, but as I toiled on the AU1 setup, it occurred to me that my AU2 solution is likely only going to work solidly for the first transfer out to ATR, after which things will likely not go well. I did not mode switch back to Au2 to test further. The Au1 setup seems to be even more of a challenge. Most of the challenge on the AGS side (we’ve not yet thought the RHIC side thru) revolves around the mechanics of the setup, in particular the beam locked RF setup.

If this continues to be a desired course of action, which is for those on high to decide, we’ll need to do more head scratching. Bottom line is that I don’t think the problems are insurmountable, but they will take more time and effort to solve.

Freddy spent today working on required hardware modifications related to the RHIC PP 9 MHz system, but which impact our ring to ring synchro setup. I think he’s got the hardware basically set now, but it needs to be installed and tested. Also, some intrepid LLRF person should probably start thinking about RHIC LLRF setup, as I believe we’re getting somewhat close to needing that system.

Also, KLZ is waiting on LLRF folks to address a booster LLRF issue impacting his ability to improve the BU1 Au cycle efficiency. Not sure when we’ll get to it.

Another solution to the A5 kicker width problem may be to inject into AGS at a velocity that is low enough to provide the necessary gap for the kicker. This option is being explored. (If one goes too low, the current required in the Booster F6 ejection magnet becomes so low that the power supply no longer regulates.)

27 Sun 4 Nov

During the early morning hours mode switching between deuterons and gold (with the correct gold rigidity at AGS extraction and in the ATR line) was exercised several times. Switching time is now approximately two minutes. The eight-to-four merge of deuterons on the AGS injection porch was found to be not working.

Later in the morning Peggy Harvey and Kevin Smith were consulted about the deuteron bunch merge in the AGS. They came in and fixed it. Setup with both deuterons and gold then continued.

The blue ring appears to be cold and the 4K wave is proceeding around the yellow ring.

Don Bruno and co-workers continued PS work in blue.

28 Sat 3 Nov

During the early morning hours, gold beam was transported to the w dump and mode switching between deuteron and gold setups was exercised several times. Nick Tsoupas came in later in the morning and found that AGS extraction (of gold) had been setup at the Run-7 magnetic rigidity. This was fixed and gold was extracted and transported to the w dump at the magnetic rigidity required for d-Au Run-8.

Don Bruno and co-workers worked on RHIC power supplies.

29 Fri 2 Nov

During the early morning hours, gold beam was transported to Booster and Keith Zeno setup Booster injection, capture, acceleration, and extraction. Intensities were 3.3×10^9 at Booster input and 1.0×10^9 late. Travis was then able to establish BTA transport and circulating beam on the AGS injection porch.

During the morning, Peggy Harvey setup four transfers of gold from Booster to AGS per AGS cycle.

During the afternoon and evening Peggy Harvey, Freddy Severino, and Kevin Smith setup Booster-to-AGS synchro, cogging, and the 24-to-4 merge of gold bunches on the AGS injection porch. Peggy, Freddy, Kevin,

and Keith Zeno then worked on acceleration. Keith setup the AGS gamma-transition jump. By 10 pm gold had been accelerated to top energy in AGS and extraction setup began. **By 11:40 pm gold was being extracted into the ATR line.**

30 Thur 1 Nov

Cooldown (to 4K) of blue began today.

The planned Booster MMPS LIPA switch maintenance began at 6 am and continued throughout the day. During this time the Booster A3 RF station was repaired. (In addition to the blown Ross relay, a faulty ENI was found and repaired.) By 19:20, controlled access LOTO was off both Booster and AGS. The LIPA work was finished by 22:30.

Then it was found that the C1 injection bump was not pulsing; this was fixed by 23:15.

By 23:30, deuteron beam was accelerating to top energy in AGS. Due to RF hardware changes (having to do with keeping track of RF buckets with and without beam) made during the day, AGS extraction could not be setup. It was decided to fix this tomorrow.

During the rest of the night, gold beam was transported to Booster and Keith Zeno setup Booster injection, capture, acceleration, and extraction. Travis was then able to establish BTA transport and circulating beam on the AGS injection porch.

31 Wed 31 Oct

During the early morning hours, deuteron beam was transported to the w dump.

Further work on the deuteron setup during the morning and early afternoon was hampered by a water leak in the x-arc followed by a UPS failure. By 4 pm extraction and transport to the dump was restored, but then equipment had to be shutdown for the planned 911-17 feeder cable repair.

The cable repair was completed and power was restored by 21:46. However, recovery efforts continued throughout the night. A relay in the Booster A3 RF station was blown while attempting to bring on the

station. It was decided to work on the repair during the Booster power outage (for Booster MMPS LIPA switch maintenance) planned for 7 am to 7 pm tomorrow.

32 Tue 30 Oct

During the day work was done on getting eight transfers from Booster to AGS (per AGS cycle). It turns out that the A5 kicker pulse is a little too wide to fit in the gap available for the eighth transfer. One resolution to this problem would be to do just six transfers into the eight waiting buckets. This would provide more than enough time for the kicker. In principle one could then do the eight-to-four merge as before (yielding three instead of four bunches), but some new RF circuitry is needed to keep track of which of the harmonic eight buckets are occupied. Tom Hayes thinks this is fairly easy to do. This circuitry would also be necessary for a scheme in which eight bunches are transferred to eight of 12 waiting buckets on the AGS injection porch. In this scheme there would be four equally spaced empty buckets. The eight-to-four merge could take place as before, provided empty buckets are not mixed with full buckets during the merge. In the afternoon, proper timing of the G10 kicker was established so that work on AGS extraction could proceed.

Overnight, deuteron beam was successfully extracted from AGS and transported to the w dump. (This effort was hampered first by a closed vacuum valve in the AGS ring and then by the H10 power supply being in Local with no indication of this status in the MCR.)

33 Mon 29 Oct

The reason for the jitter in the frequency on the AGS injection porch was found in the morning and the problem was fixed. Freddy Severino and Kevin Smith were then able to set up the eight-to-four merge and accelerate to full energy in AGS; they finished their work at 10:30 pm. Operations then tried to set up AGS extraction, but proper timing of the G10 kicker could not be established. Beam was then turned over to Tandem for the rest of the night.

34 Sun 28 Oct

Freddy Severino and Kevin Smith were not able to setup the eight-to-four merge of deuteron bunches on the AGS injection porch because the AGS RF was drifting (for unknown reasons) and causing problems with Booster-to-AGS synchro. At 8:30 pm the decision was made to quit for the day to get some much needed rest. After the setup in Booster and AGS was documented, the beam was turned over to Tandem for the night.

35 Sat 27 Oct

Early in the morning (6:45) the deuterium source failed (after a night of intermittent failures) and had to be replaced. Deuteron beam was re-established in Booster around 10:00 am. **Freddy and Peggy worked all day on Booster-to-AGS synchro and finally got it to work around 8 pm.** (The long delay was due to the failure of a crucial piece hardware.) Leif was in and worked with beam in Booster and AGS.

During the remaining part of the evening Freddy and Peggy setup cogging between Booster and AGS, but they were unable to establish the eight-to-four merge on the AGS injection porch. At 11:30 pm the decision was made to quit for the evening, get some much needed rest, and resume work on the merge Sunday morning.

Operations worked for a while on the transfer efficiency between Booster and AGS, documented the setup, and then turned the beam over to Tandem for the rest of the night.

36 Fri 26 Oct

In the morning it was discovered that a vacuum valve just upstream of the L20 inflector was closed. This is most likely the reason for the low intensity in AGS overnight.

Nsrl finished its Fall run (Nsrl07c) at 1:30 pm. The iron setup was then documented and Greg Marr proceeded to test mode switching between iron and deuterons (in preparation for deuteron-gold mode switching).

Around 4 pm, the beam was turned over to Tandem. They needed two hours to switch the source pulser from MP7 to MP6 and re-establish

deuteron beam. During this time a gold target was also installed in MP7 for the startup of gold operation.

After some problems with the source, deuteron beam was re-established in Booster shortly before 8 pm. Transfer efficiency between Booster and AGS was found to be good (so the closed vacuum valve was indeed the reason for the very low efficiency seen last night).

Keith Zeno setup Booster with nine cycles per AGS cycle. The first cycle is a “dummy” used to reset the field; the remaining eight were setup with beam. Do to unexpected hardware failure, Booster-to-AGS synchro was not set up. There were intermittent source problems throughout the night.

37 Thur 25 Oct

During the evening, RF personnel completed their work on the two-to-one merge of deuteron bunches in Booster. The merge is now considered operational and merged bunches are accelerated to full energy in Booster. Keith Zeno worked overnight on BTA transport and AGS injection. He found that only 10% of the beam at Booster extraction makes it into the AGS.

38 Wed 24 Oct

During the evening, work continued on the two-to-one merge in Booster. The RF group had some success and were able to make the merge happen. However, nontrivial hardware changes were required and more time will be needed to make the merge fully operational. After the RF group had finished their work for the evening, Keith Zeno proceeded to accelerate un-merged deuteron bunches to full energy in Booster. He then extracted them, transported them down the BTA line, and injected them into AGS. He was able to get several turn survival on the AGS injection porch.

39 Tue 23 Oct

During the evening, work proceeded on the two-to-one merge with deuterons in Booster. Here, as per Alex Zaltsman, is what happened.

We did not get too far last tonight. Here is what we know:

1. We closed the loop that makes Band-3 cavity follow the Band-2, we found a sign flip of the loopAmp input signal.
2. Band-3 follows Band-2 when Band-2 is the master, But when we switch to make Band-3 the master (Mode2), the loops are not happy.
3. We believe we need to re-tune Band-3 cavities, since they will trip on window comparator really on the cycle if we try to raised the Voltage. We will like to make sure our loop problems are not due to the lack of gap voltage on Band-3.

40 Mon 22 Oct

After NSRL finished its scheduled activities for the day, deuterons were injected and accelerated (on $h = 2$) to top energy in Booster. No work was done on the merge because RF personnel were not available.

41 Tue 9 Oct–Thur 11 Oct

RHIC Dry Run.